ATCO NEWSLETTER

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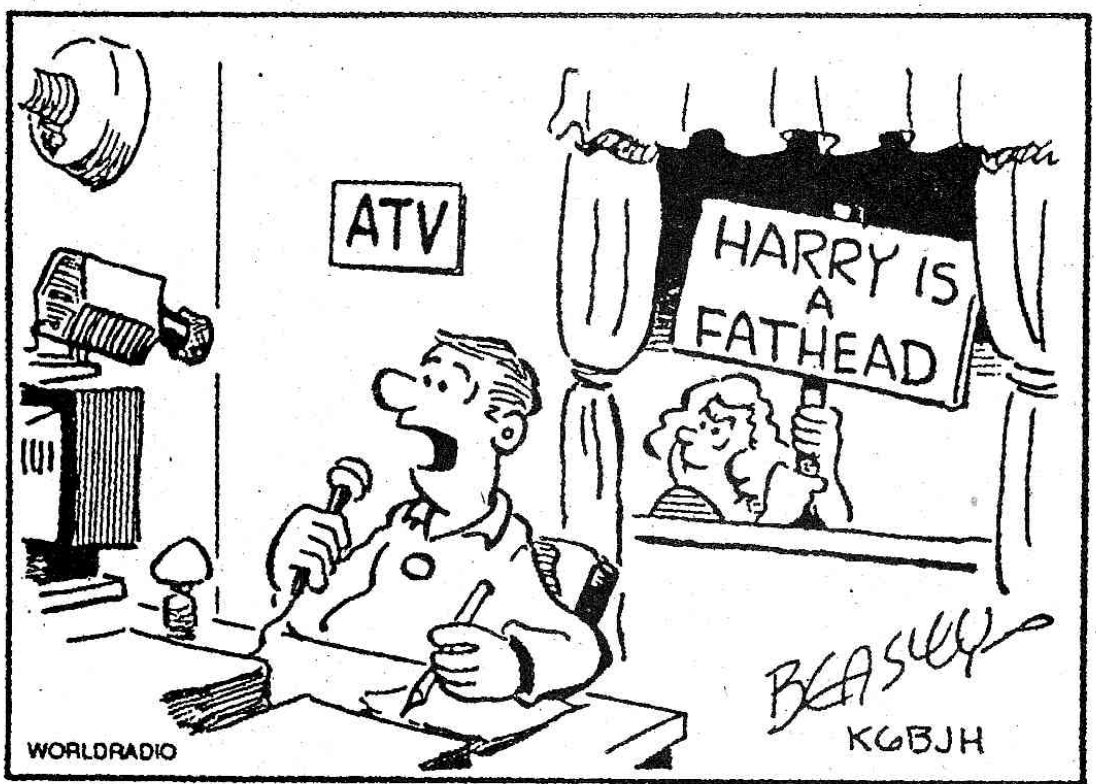
The ATCO newsletter is the official publication of a group of amateur television operators known as "AMATEUR TELEVISION IN CENTRAL OHIO Group Inc" and is published quarterly (January, April, July, and October)

ATCO SPOTLIGHT TOPIC

Thanks to Beasley, K6BJH (SK) and ATVQ Magazine for allowing us to share his cartoons. For the complete book on "The Best of Beasley" go to the ATVQ Magazine web site (http://atvquarterly.com/) available for purchase.



I TRY TO KEEP THE XYL OUT OF THE SHACK, HARRY---SHE MAKES RUDE REMARKS TO SOME OF THE GUYS I TALK TO

ACTIVITIES ... from my Workbench

Well, there is not a lot to report this time. My tower/antennas are now operational but need some "fine tuning" but that's another time and an ongoing project. As they say, if the antennas stay up and operational for more than a year, they're not big enough or there are not enough of them.

Actually, now that I mention it, my 10 GHz antenna worked OK before I had my tower accident where it came down and broke the feed arm. After re-installing it, the signal is much less than before. Since I had to straighten and re-align the feed arm holding the LNB, it might not be aligned correctly. The only way I know of to fix that is to remove it from the top of the tower mast (it's the highest one which requires the others to be removed first) and set it up in the driveway on a stand pointing toward a signal source at the other end of the driveway. That way I can play with the feed, the arm and the vertical angle to make sure it's correct.

Next, during the Red-White-Boom surveillance video setup I noticed a repeater problem. We are using 2398MHz to send video from the Gas Co roof to the Police HQ. This time the antenna positioning was such that it was also received at the repeater. I can't turn off that input because the camera is tied to it. So far, so good but as long as there is valid video signal at the 2398 input, the roof camera cannot be selected. Confusing, yes but let it be said that the roof camera cannot be used during that time. Temporary solution: go to the repeater and unplug the video cable from the 2398MHz receiver. I'm not sure how to fix that problem for the long term but, for now, it's not an issue. Next year if the problem is not fixed, we'll just go there and unplug the cable again. That reminds me, we haven't re-connected the cable yet so the 2398MHz repeater input is not available.

Another repeater issue is still not fixed. The 427MHz output desenses the 1280MHz input slightly. Terry, W8ARE, has difficulty getting into the repeater with his 1280MHz digital signal. It shows up initially but then is locked out by the 427 signal desense. I know the problem which is some low stage low power oscillator in the 427 transmitter not sufficiently shielded that is coupling directly to the 1280 receiver but I must pull the whole transmitter and bring it home to fix it.

Last but not least is the failing radomes on the repeater 427 transmit and 439 receive antennas. They have served us well for over 15 years but need new covers to keep the creepy crawlers (and water) out. It's easy to repair but I need someone to help. It is NOT a one man job! Are any of you up to the challenge?

OK, so much for the stuff we have already done or in the pipeline. Let's now talk about what we should do in the future!!!!

We've discussed the possibility of adding or replacing the 427MHz analog output with digital before but with no emphasis. Now is the time to give it some serious consideration. Should we replace our existing 427 output with a digital one? I need comments on this one so let me know how you feel. Some factors to consider are as follows:

1. Proposed is QAM modulation, the same used by cable "open QAM". All newer TV's have this capability without modification.
2. The channel we'd select is the same as 427.25 but with the carrier shifted to be compatible with the standard cable channel 57.
3. Multiple video channels are possible within the single RF carrier.
4. You would have to replace your analog TV or receive converter with a digital cable ready TV set. Most flat panel TVs already have this capability built in. If you don't have a compatible TV, small screen flat panel TV's cost less than $100.
5. Maybe we can remove 2.4GHz transmit/receive equipment & replace with vertical 70cm antennas for a digital transmitter/receiver. That way we can maintain the analog 70cm equipment for now. (I don't see much use on 2.4GHz anymore because of Wi-Fi).
6. I could add a digital transmitter and multiplex it into the existing 70cm/1200MHz antenna now used for 1268MHz.

Now, let's consider changing the 427/439 transmit/receive antennas to vertical polarization. A discussion on this topic is also needed. Some factors to consider are as follows:

1. This would help increase transmit signal strength and coverage because omni high gain vertically polarized antennas are practical.
2. Vertically polarized antennas are much smaller and easier to maintain.
3. It is easy and less noticeable to have a vertical receive antenna.
4. Many of us already have an omni vertical receive antenna for NBFM repeater use at the upper end of 70cm.
5. It would require those of us with horizontally polarized beam antennas to either rotate the elements to vertical or install a new vertical antenna.
6. Many don't have the room for another antenna or want to bother altering the present one.
7. Some additional interference can be expected from the NBFM repeaters because we will loose the cross polarization rejection.
8. We'll cause less interference to 70cm DX'ers operating on 432MHz at the same time.

That's all for now folks. Please send in articles for the Newsletter and be more active on our Tuesday night nets! We're down to about 6-8 regular check-ins. I'd really like to see and hear from more of you.

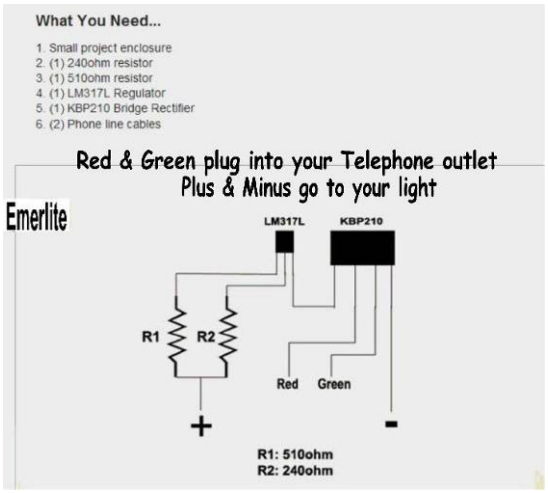
…73, WA8RMC

TIPS, TECHNIQUES AND IDEAS!

We need to hear from those that find their tips and techniques useful. I encourage those that have solved a problem in a unique way, ATV related or not, to share with the rest of us! Email me your idea or solution to towslee1@ee.net. Thanks WA8RMC

Dale, WA8KQQ writes,

"I ran across this little project on YouTube - works great - I made the circuit in a little plastic box that something else had been in at one time - you know when the power goes out it's nice to have a light of some kind - when the power goes out your telephone line still has between 56 - 60 volts available - you can use junk box LED's or I did a little looking around and found a 12 LED light on an adjustable head band at Big Lots for $5.00 - you get the light plus 3 batteries (you won't need) and also a little key chain light with the batteries. Just build the circuit and hook the + & - to where the batteries go in the light and the red & green to however long cord that you need with the proper plug on the end to fit your phones wall outlet and you have a light source - the light from Big Lots - first time you press the button you get 4 LEDS - 2nd you get 8LEDS and 3rd you get all 12 LEDs - 5th it blinks so you might put a piece of red cellophane in front of it if you need help - 6th is off - comes in real handy if you don't have a generator or battery bank - hope this might be useful to someone.
73's
Dale
…WA8KQQ



Dave Pelaez offers this interesting photo,

"Art, Can you use this photo of the "no ATV" sign? See attached.

Cheers,
…Dave Pelaez AH2AR

(Damm!!! No amateur television on the beach. Now, how are we going to share our girl watching?????????)

MINDBENDER

(From the Agilent Newsletter July 2013)

Problem: Jack sat in his father's office, atop a bookcase by the wide, floor-to-ceiling window. His father's employer had built this skyscraper right on the shoreline of the lake, directly across which stood the tallest tree in the state. Jack's view was spectacular, and, as he looked across the 866 ft. wide lake, he noticed something which he found interesting. When he gazed at the highest point on the tree, his line of sight was at a 30 degree incline above horizontal. When looking at the base of the tree where it met the water at the far edge of the lake, he was looking at a 30 degree declination. How tall is the tree?

Bonus: Later, after querying his father, he found out that the first floor of the office building was at ground level, and every subsequent floor was exactly 12 ft. above the one below. What floor is his father's office on?

Solution: The tree is 1000 ft. tall. (*Wait a minute! What's wrong with this? Have you ever seen a 1000 foot high tree??*)

Start by picturing a triangle formed by Jack's line of sight to the base of the tree, the lake's surface, and the building. Since the tree and building are at the lake's edge, they're level with each other and the triangle is a right triangle. The angle at the base of the tree is 30 degrees. Using trigonometric functions, we can find the unknown lengths of the triangle. The line of sight is the hypotenuse of the triangle. The height of the building where Jack sits is the side opposite the 30 degree angle. The length across the lake, 866 ft., is the adjacent side.
Cosine = adjacent/hypotenuse and Tangent = opposite/adjacent
Thus:
Cos (30)= 0.8660 = 866/hypotenuse Jack's line of sight is 1000 ft.
Tan (30)= 0.5774 = opposite/866 -> Jack's height is 500 ft.
Now, we turn our attention to the triangle formed by the tree and both of Jack's lines of sight. We can see that it's an equilateral triangle, consisting of three 60 degree angles, and therefore all sides are equal. Thus the tree is 1000 ft. high.

Bonus: Jack's height was 500 ft. The largest whole multiples of twelve to divide evenly into that is 492(41x12), placing the office on the 42nd floor (41 above the first floor). Jack's perch atop the bookcase put his eyes eight feet above the floor, rounding out 500 ft.

OK, you didn't like that? Well, here's another one.

Problem: A number of children are standing in a circle. They are evenly spaced and the 7th child is directly opposite the 18th child. How many children are there altogether?
Solution: There are 22 children in the circle. In half of the circle there are 11 children because 18-7=11. Multiply 11x2=22!

FCC SEEKS COMMENT ON WAIVING ANALOG TUNER REQUIREMENT

(*For the complete article see TV Technology Magazine July 12, 2013 by Doug Lung*).

Echostar wants to import DVR sans analog chip
Although all full power TV stations in the United States had to shut off their analog transmitters on or before June 12, 2009, low-power TV stations and translators are allowed to continue transmitting analog signals until Sept. 1, 2015. As a result, manufacturers and importers of TV tuners into the U.S. must include analog reception capability under FCC Rules. This states, "TV broadcast receivers shall be capable of adequately receiving all channels allocated by the Commission to the television broadcast service."

The FCC Media Bureau is seeking comment on a request for waiver from EchoStar Technologies that would allow them to import, market and sell two models of the Channel Master K77, an HD, Internet-enabled, digital video recorder that does not include an analog tuner. The difference between the two units is the amount and type of DVR storage.

In the request for comments the Media Bureau states, "EchoStar maintains that requiring an analog tuner would dramatically increase the device's cost, size, and energy consumption without any countervailing benefits to consumers. Further, EchoStar claims that consumers who purchase the device would still be able to access analog signals through their television tuners."

In requesting comment on EchoStar's request for waiver of analog tuner capability for the Channel Master K77, the Media Bureau notes that, "unlike recent similar petitioners, EchoStar did not voluntarily commit to educating consumers about the functionality of the K77 devices. Accordingly, we seek comment on whether EchoStar should be required to undertake similar consumer education efforts as a condition of any potential waiver relief." The other two petitioners received a waiver.

See more at: http://www.tvtechnology.com/distribution/0099/fcc-seeks-comment-on-waiving-analog-tuner-requirement-/220308#sthash.Y6BgkSK3.dpuf

SUPER WIFI' CAMPUS WHITE SPACE NETWORK

(*For complete article see TV Technology magazine July 12, 2013 by Doug Lung*)

West Virginia University Launches First Super Wifi' Campus White Space Network.

Network uses TV band white space frequencies to provide free public Wi-Fi access.
West Virginia University (WVU) this week announced it had launched the nation's first campus 'Super Wi-Fi' network. The network uses TV band white space frequencies to provide free public Wi-Fi access for students and faculty at Public Rapid Transit (PRT) platforms. From what I can see from the WVU Office of information Technology web site and from the WVU announcement, the 'Super Wi-Fi' system is not being used to deliver Internet directly to users but to Wi-Fi hotspots that allows them to access the network using their existing Wi-Fi devices.

The university partnered with AIR.U, the Advanced Internet Regions consortium. I could not find the Consortium's web site but a New America Foundation press release stated the consortium was formed on June 26, 2012 and includes higher education organizations representing over 500 colleges and universities as well as Microsoft, Google, the Open Technology Institute at the New America Foundation, the Appalachian Regional Commission, and Declarations Networks Group (DNG), an organization created to plan, deploy and operate 'Super Wi-Fi' technologies.

“AIR.U’s initial deployment, blanketing the WVU campus with Wi-Fi connectivity, demonstrates the equipment capabilities, the system throughput and performance of TV band frequencies to support broadband Internet applications,” the university said. “AIR.U intends to facilitate additional college community and rural broadband deployments in the future.” The announcement said WVU can use the white space links to “add additional Wi-Fi hotspots in other locations around campus where students congregate or lack connectivity today.” One possible future application is providing Wi-Fi connectivity on PRT trains.

There was no description of the hardware being used for the network, but Paul Mitchell, general manager/technology policy, at Microsoft commented, “White spaces technology and efficient spectrum management have a huge potential for expanding affordable broadband access in underserved areas and we are pleased to be partnering with AIR.U and West Virginia University on this new launch.” Bob Nichols, CEO of Declaration Networks Group, LLC said, “Super Wi-Fi presents a lower-cost, scalable approach to deliver high capacity wireless networks, and DNG is leading the way for a new broadband alternative to provide sustainable models that can be replicated and extended to towns and cities nationwide.”

In a statement on the WVU TV white spaces network Acting FCC Chairwoman Mignon Clyburn said, “Innovative deployment of TV white spaces presents an exciting opportunity for underserved rural and low-income urban communities across the country. I commend AIR.U and West Virginia University on launching a unique pilot program that provides campus-wide Wi-Fi services using TV white space devices. This pilot will not only demonstrate how TV white space technologies can help bridge the digital divide, but also could offer valuable insights into how best to structure future deployments.”

For TV white space devices to be successful, there have to be TV white spaces. This would allow the excess spectrum, where available, in to be used for TV band white space devices, TV translators and LPTV stations, all of which can provide valuable service to rural areas.
See more at: http://www.tvtechnology.com/distribution/0099/west-virginia-university-launches-first-super-wifi-campus-white-space-network/220307#sthash.9rxh6TEx.dpuf

ATCO SPRING EVENT 2013

Sunday, April 21, 2013

Attendees:
John Evans, WA8TZY
Ken Morris, W8RUT
Bob Tournoux, N8NT
Phil Morrison, W8MA
Charles Beemer, WB8LGA
Mike Bowlus, KD8KDM
Bob Rector, W8RWR
Dick Goode, W8RVH
Stanley Diggs, AA8XA
Terry Meredith, W8ARE
Jay Caldwell, KB8YMQ
Roger A. McEldowney, WB8DZW

Robert J. Holden, KD8TIZ
Robert Hodge, N8OCQ
Joe Ebright, KC8YPD
Jeff Patton, K8TPY
Art Towslee, WA8RMC
Mark Cring, N8COO

Weather was a bit cool so there was not much in the way of tailgating at this Event. Also, attendance was WAY down. (I don't know why!)

A lunch of chicken, baked beans, cole slaw, potato salad and cake for dessert was enjoyed by those attending. Thanks to Art for picking up the food and drinks!

Art gave a welcome and thanks to all attending.
Attendees rose and introduced themselves around the room.
Several topics came under discussion:
The antenna radomes for 427 and 439 are going to need maintenance as they have deteriorated. They have been up 10 years and have deteriorated. Art will need help as it's not a one person job.

Also plan to get tower camera going at Jones Rd. site facing west to see incoming weather.

Red, White and Boom is coming up and need volunteers to assist with that. Good look at the fireworks if one hadn't experienced it before.

The lunchroom may not be available for future meetings at ABB, but there may be other conference & training rooms available for use.

The meeting wrapped up with the usual highlight of door prizes to be drawn. There were a number of nice door prizes including several O'scopes, Vector analyzer, power supplies, 2 meter radios, Rigblaster – many more nice items not listed here. There was also a case of high quality solder, so everyone should have received a 1 pound roll of solder and a handful of relays, as well! (***See what you guys that didn't attend, missed***?)

No one should have gone home empty handed!

Video is available of the meeting which gives more details and any other topics I may have missed.

…Mark Cring, N8COO.

13CM SPECTRUM ISSUES

Just a reminder that the closing date for the Ofcom 2.3 GHz consultation process is next Monday. I believe that everyone in the UK, whether active on 2.3 GHz or not should respond, as we need to show Ofcom that we value the spectrum we have access to.

If they do not see a large response, they will be more inclined when considering the future of other bands, such as 10 GHz, to take the approach of the authorities in Sweden and Australia and just remove our access to bands without consultation.

In order to encourage responses from the ATV community, who are particularly affected by the proposed changes, I have posted my own proposed responses on the BATC forum at http://www.batc.org.uk/forum/viewtopic.php?f=2&t=3176&start=10

Chris GW4DGU has also published his responses in the latest issue of Scatterpoint. Thanks to the good work by the RSGB and others we do have a good relationship with our regulator in the UK and this is the opportunity for us all to show them how much we value the spectrum we have access to.
…Noel - G8GTZHi

Whatever you do, don't let go of the lower end of the 13cm band! It has caused me no end of problems with ATV experiments here in New Zealand. There is no way ATV will work within the same band as Wi-Fi. The interference is so bad here I can only use spread spectrum transmission to hop around other users. Once this is lost it will be the end of ATV on this band as we know it.

These days we have so little spectrum for ATV, we need to come up with a plan to protect what we have left. It's got to the point here in ZL where we have no longer got access to 70cm, 13cm and not much space left on 9cm. This is why I think it is important to come up with a common band plan world wide, for all Ham bands from 23cm to 3cm. This is to make a clear statement that we wish to use these microwave bands in the future for all kinds ATV extermination and wide band usage.
…Grant, ZL1WTT

NEW TV MODULATION ANNOUNCED

(*For complete article see TV Technology magazine July 18, 2013 by Doug Lung at link below*)

'Transpositional Modulation' Could Greatly Boost Data Rates. Called 'first truly new form of modulation in more than a decade' TM Technologies, a division of Medusa Scientific, announced this week that it has successfully demonstrated a "breakthrough modulation technology" that has the potential to increase data rates between two and 33 times within a given amount of bandwidth.

The new modulation technique is called "Transpositional Modulation"(TM). Medusa Scientific's Chief Scientist Rick Gerdes said it is "the first truly new form of modulation in more than a decade, and the only form of RF modulation that has a real DC response and is completely transparent to other modulation forms."

According to Gerdes: "TM allows transmission of much higher data rates than is possible with other forms of modulation alone; can be added to existing modulations or can operate stand-alone; is immune to Doppler effects; can combine multiple different data streams into and out of a single signal, and; generally provides the capability to meet the data rate demands of UHD and other data-intensive RF requirements."

The news release said the company expects to complete a prototype satellite modem for testing in August that is expected to dramatically increase "bent-pipe" data rates. A demonstration of transmission of 4K UHD is planned for early September.

No details were provided on how transpositional modulation works, but the news release explanation triggered memories of an early DTV transmission technology. The news release said the patent on TM is still pending, but a search for patents with Richard Gerdes as the inventor turned up Patent #5200715 – Waveform modulation and demodulation methods and apparatus and Patent #5327237 – Transmitting data with video.

During the selection of the U.S. DTV standard, this was called the GENESYS system. It is listed in Development of HDTV Emission Systems in North America by Robert Hopkins at the Advanced Television Systems Committee and Kenneth P. Davies of Canada's CBC. The paper describes the modulation "as a form of waveform modulation which carries the digital HDTV signal by modifying the shape--not the frequency, amplitude or phase of the carrier making it 'invisible' to frequency or amplitude or phase demodulators."

More information on transpositional modulation should be available after the announced demonstrations. The information provided so far mentioned an improved data rate in the same bandwidth, but I didn't see any mention of the critical third item in any modulation technology--the signal to noise (SNR) required to receive the higher data rate signal.
- See more at: http://www.tvtechnology.com/article/%E2%80%98transpositional-modulation-could-greatly-boost-data-rates--/220430#sthash.Ba7EGoR7.dpuf

LOOKING AT THE DATV-EXPRESS DIGITAL-ATV PROJECT

Most people involved with Amateur TV (ATV), now recognize the advantages of digital-ATV technology over analog-ATV. The digital modulation and Forward- Error-Correction of D-ATV provides superior video quality and robustness against ghosting.

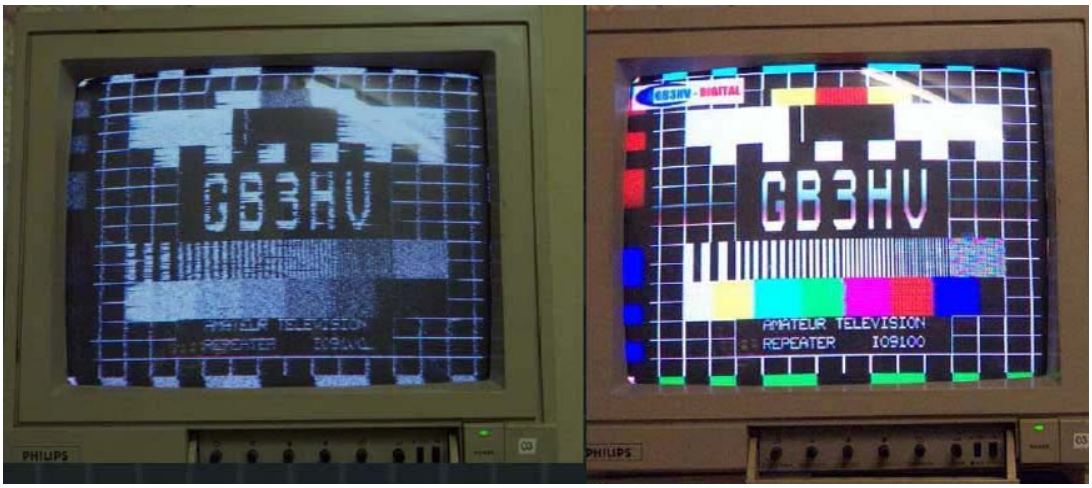


Fig 1 - Comparison of analog-ATV video and D-ATV video using same antennas with weak sigs (courtesy G7LWT & GB3HV)

For several years, hams have also recognized that the cost to buy ham-grade MPEG2 encoders boards and Digital-ATV exciter boards is too expensive. A ham-grade set of MPEG-2-and-DVB-S boards from SR-Sys in Germany cost about US$875. The cost of commercial-grade digital-TV boards is even higher. This high cost is known to prevent many hams from "trying Digital-ATV". A group of hams in US and England got together at the end of 2010 to start a project that will lower the cost of DATV considerably. The open-source project is known as DATV-Express. The team members are:

- Art Towslee WA8RMC – electronics design
- Charles Brain G4GUO – software design
- Tom Gould WB6P – PCB layout design
- Ken Konechy W6HHC – project mgmt & pubs

System Block Diagram for DATV-Express

The most important concept about the DATV-Express board is that it is software-based SDR radio. While the system block diagram for a typical Digital- ATV DVB-S transmitter using the DATV-Express board is shown in **Figure 2**, the modulator and the software can also produce several other types of modulation and protocols, such as DVB-T and DVBS2. The analog output of a video camera is sent to an MPEG2 encoder unit (made by Hauppauge) to compress the video stream. The video file is stored on a PC and a Windows-based or Linux-based PC does much of the "heavy lifting" to provide real time processing of the Program Stream from the MPEG2 Encoder into a Transport Stream to be used with the DVB-S protocol. The PC processes most of the protocol streams down to the IQ symbol bit-stream that is output via USB2 to the DATV-Express board. Then an FPGA manipulates the data and sends an I-stream and a Q-stream to a modulator. The operating frequency for the DATV transmitter is determined by the PLL within the IQ modulator chip and can be selected by the PC GUI for 70 cm, 23 cm, or 13 cm bands. The RF output level from the DATV-Express board is fairly low, usually around 0-to10 dBm. So the typical DATV station will probably follow the DATV-Express RF output with about two stages of RF amplifiers to get up to a normal transmitter power level. The DATV-Express project team also recommends using an external band-pass filter to get rid of harmonics.

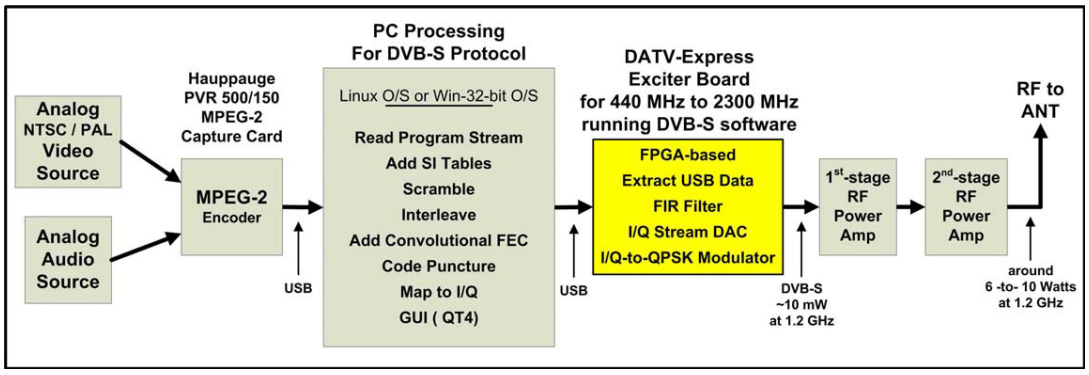


Fig 2 – System Block Diagram of Typical DATV-Express Project DVB-S Digital-ATV Transmitter
PC can also run software for DVB-T and DVB-S2 DATV protocols

The DATV-Express Board

The DATV-Express exciter is a single printed circuit board shown in **Figure 4**. Art WA8RMC has the skills to hand-solder the fine-pitch SMT components. The 4-layer board dimensions are 5.3 x 3.18 inches. Tom WB6P used a schematic-capture tool called DX-Designer and layout tool called PADS to create the PCB.

Fig 4 – the DATV-Express exciter board is a single printed circuit board mounted in a plastic project box.

The connector for USB2 is on the left side. The RF SMA connector is on the right side of the board. **Fig 3** shows a more detailed block diagram for the DATV-Express board design. The PLL on the Analog Devices ADRF6755 IQ modulator allows defining an RF frequency between 72.5 MHz and 2480 MHz. The board contains a total of five DC regulators providing DC outputs between 5.5 VDC to 1.2 VDC for the various chips.

A small MiniCircuits GVA-84+ RF buffer amplifier follows the IQ-modulator chip. Initial bench tests on the first prototype board measured output of 18 dBm on 1.3 GHz. The initial RF etch layout was not done well and resulted in a noisy output and tended to self oscillate. These RF problems were cleaned up in an etch-update called Version 2. **Figure 5** shows the cleaned up RF modulation (QPSK constellation) output, compared to the original etch layout. **Figure 6** shows the fairly clean 1.3 GHz RF spectrum. The spurs are down about 55 dB from the CW carrier.

Fig 5 - On the left is the clean QPSK modulation Constellation from the new second board etch layout. On the right is the noisy QPSK Constellation from the original board etch layout

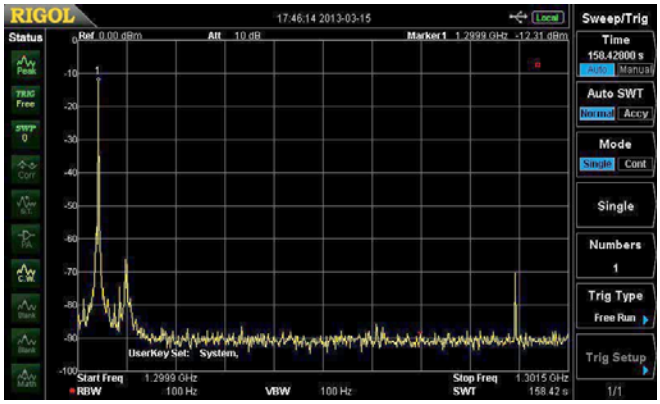


Fig 6 - Spectrum of new board with 1.299 GHz unmodulated carrier signal.

Software for DATV-Express

The DATV-Express project uses three sets of software:

Software that runs on the external PC or Raspberry- Pi, etc.
Software that runs on the 8051 (inside FX2 USB controller)
Verilog code that defines the FPGA functions.

The main focus of the project currently is getting to release the PC software using 32-bit Linux (Ubuntu Version 12.04.02 distribution).

Currently the PC software does most of the protocol processing. An important function of the PC is to keep symbol rate constant, no overruns or under runs by adding Null transport packets as needed. The PC software also can download the firmware for the 8051 microcontroller. There is an on-board boot-ROM chip for storing firmware, but the project has not utilized it, yet. Finally, the PC downloads the code that goes into the FPGA.

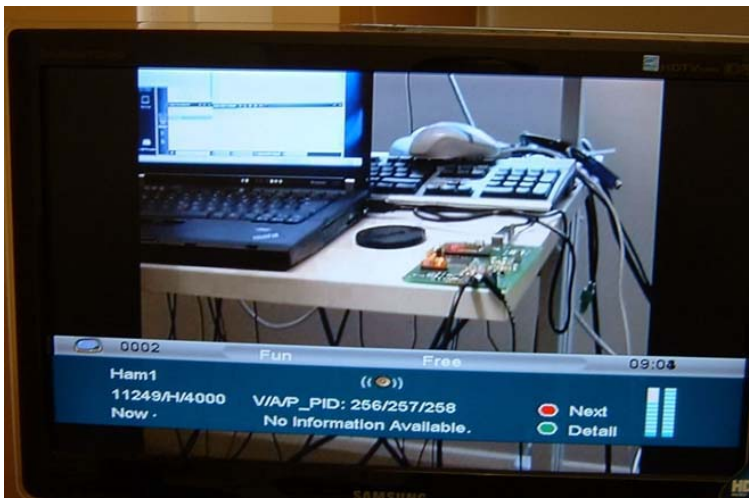


Fig 7 – The first DVB-S video ever transmitted by the DATV-Express board

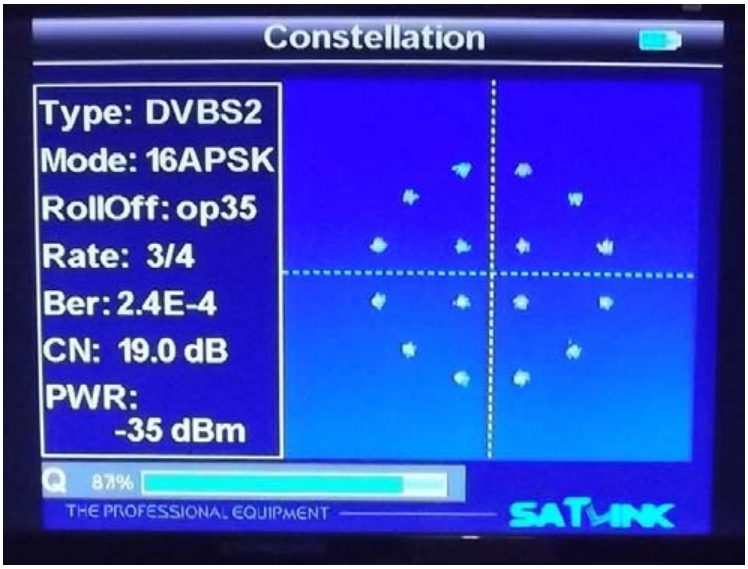


Fig 8 – This constellation of 16APSK digital modulation is being used on a DVB-S2 protocol transmission

The USB controller delivers the IQ symbol stream to the FPGA using a 16-bit FIFO on the EP1 bus. The FPGA firmware does a number of shaping functions of the IQ streams as well as calibrating for any IQ modulator offset mismatches in gain.

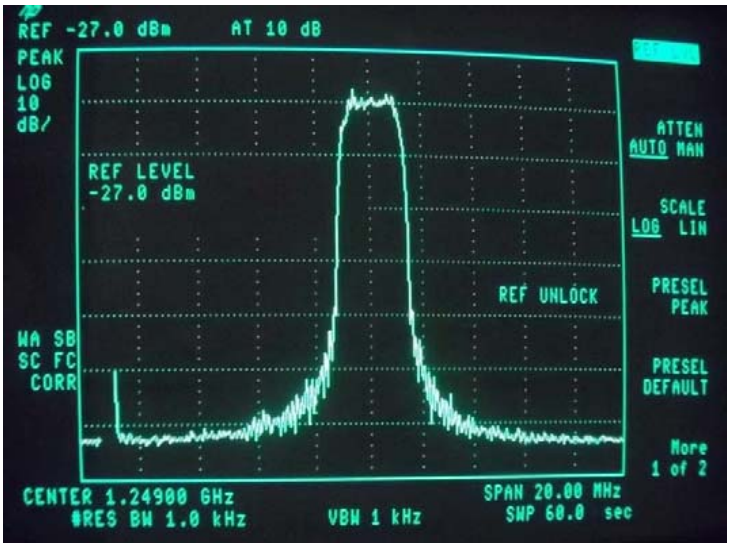


Fig 9 – 2 MSymbols/sec symbol-rate spectrum achieved using DVB-S2 protocol on 1.249 GHz.

Figure 9 shows a DVB-S2 signal using 32APSK modulation being filtered by a 95 tap x8 interpolating filter with a roll off of 0.35 and a compensated root raised cosine response. The filter takes the DVB-S2 symbols and interpolates them by a factor of 8 to put the aliases

outside the LC Nyquist filter response. It is difficult to believe that 6 Mbits/s of video is crammed into that piece of spectrum approximately 2.5 MHz wide. The blip on the left hand side at 1.24 GHz is probably a multiple of 20 MHz reference clock signal on the board. The blip remains stationary when the operating frequency changes.

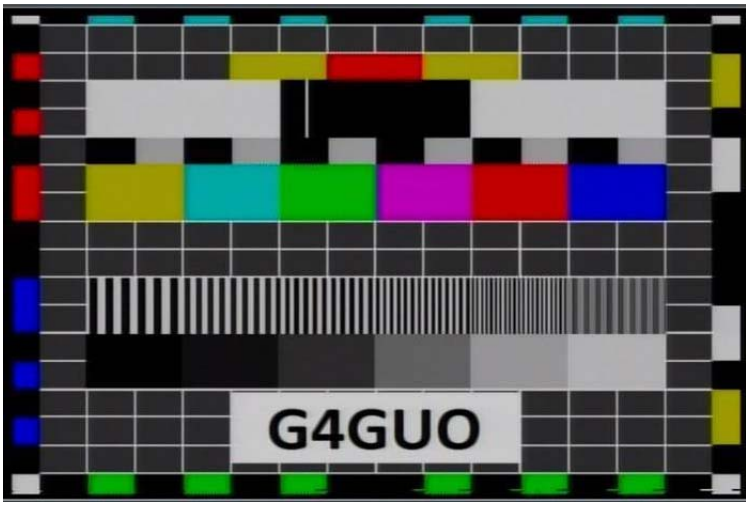


Fig 10 – Test pattern received using DVB-T protocol with 7 MHz bandwidth on 1.3 GHz

The QT4-based GUI on the PC (see **Fig 11**) controls which protocol to download, the PLL frequency, Symbol-Rate, the FEC configuration settings, and the RF power output level.

Fig 11 – The simple GUI being used by the DATV-Express software

Project Plans

The primary goal right now is to get the board and software ready to distribute into the hands of hams. The team is working towards a "final" etch-update for pre-production to resolve some inner-layers etch clearance issues and make some silk screen changes like adding the CE Mark symbol. The preproduction run will also confirm the correctness of the solder-paste stencil file and the pick-and-place file. The first release of software will run on the 32-bit Linux. A little later, further releases of software will run on 32-bit Windows OS. Right now the team hopes to have a few boards ready towards the end of this year, probably in October. Another plan is to make the design files of this open source project available to anyone. This includes hardware design (like schematic capture and Gerber files) as well as software source code for PC and Verilog. In this way, other hams can experiment and extend SDR and even manufacture the boards if that is their commercial goal. Finally. Charles G4GUO has also been looking at what might be done using the Raspberry-Pi (ARM based) single board- computer and/or the MK808 media player (also ARM based) to interface with the DATV-Express board as an alternative to using a normal PC. With the help of Rob MØDTS, Charles has played with a modularized version of his DATV host software. It turns out that the Reed-Solomon FEC encoder software consumes a large portion of the ARM resources. Charles has tried porting the Reed-Solomon code to run inside the FPGA. This seems to work well. Also, the project is lucky that Brian G4EWJ has written an optimized version of this module in ARM assembly language. Brian's module uses about 1/4 of the processing cycles that the G4GUO C module does. So we have managed to get the whole thing down from 60% to about 20% of cycles. Further improvements can be made.

…W8HHC

Author may be contacted at W6HHC@ARRL.net - -

HAM RADIO IN SPACE

From ARRL Newsletter July 18, 2013 Editor: Rick Lindquist, WW1ME

Ham Radio in Space: ISS Crew Member Chats with Scouts in Canada via Ham Radio

European Space Agency Astronaut Luca Parmitano, KF5KDP, aboard the International Space Station spoke July 8 via ham radio and a terrestrial telecommunication link with Scouts attending the Canadian Scout Jamboree 2013 in Sylvan Lake, Alberta. Amateur Radio on the International Space Station (ARISS) arranged the event. Using the ISS call sign NA1SS, Parmitano contacted telebridge station VK5ZAI in Australia, on 2 meter FM. Audio from the VK5ZAI was relayed to Canada. The contact lasted about nine and a half minutes. The Jamboree attracted upward some 6500 youth, leaders and volunteers July 6-13 and was the largest gathering of Scouts in Canada. A day earlier, Parmitano was at the helm of IRØISS for an ARISS educational group contact with HV2VO at Ospedale Pediatrico Bambino Gesù in Vatican City.

ARISS is an international cooperative educational partnership with participation by NASA, AMSAT and ARRL.

On July 20 (1534 UTC), Scouts at K2BSA at the 2013 BSA National Jamboree in Mount Hope, West Virginia, are scheduled to speak with the ISS. Later the same day (1905 UTC), students at Colegio Uruguá, in El Pinar, Uruguay, are scheduled to speak with the ISS crew via LU8YY. ARISS requests listener reports for these contacts.

The ISS crew has been using a 5 W Ericsson hand-held transceiver for contacts in recent weeks, because of problems with the higher-power Kenwood D700 radio on board, and this can make terrestrial copy difficult. ARISS has recorded more than 800 ISS school contacts since the program began in late 2000.

On July 16 NASA curtailed a planned 6-1/2 hour spacewalk after Parmitano reported a buildup of water inside his helmet, apparently caused by a leak. Parmitano was rendered unable to hear or speak. Expedition 36 Flight Engineers Chris Cassidy, KF5KDR, of NASA helped him back inside the space station after NASA quickly aborted the spacewalk. After returning the ISS airlock, Parmitano performed what was called "an expedited process" to remove his suit. Both astronauts are safely back in the ISS as engineers continued to determine the cause of the problem, NASA said. -- *AMSAT News Service via Charlie Sufana, AJ9N; NASA*

Luca Parmitano, KF5KDP, on a space walk (NASA photo)

DATV TESTING REPORT (Bench Test of DATV-Express)

Earlier I presented an overview of the DATV-Express Project efforts and progress to create a lower-cost version of a DigitalATV transmitter exciter board and software. In this article we will perform some basic bench tests for the board. W6HHC is again pleased to be joined by fellow OCARC club member Robbie Robinson KB6CJZ for the creation of this article on Digital-ATV. Robbie is the club guru on analog ATV and commercial satellite receivers and ham microwave communications in general. **The Testing Set-up Fig 1** shows the configuration of the set-up used for testing the DATV-Express hardware board as a full-blown DVB-S DATV transmitting station on the 1.2 GHz ham band. Two RF amplifiers were used: a 1 Watt (FM rating) unit by Kuhne and a 30 W (FM rating) by Down East. An old Pentium P4 computer running at 1.8 GHz had the disk drive partitioned to install Ubuntu V12.0.4 32-bit operating system. Qt V5.0.2 with the Qt Creator application was downloaded off the internet to build the software program and graphic user interface (GUI) used by Charles G4GUO to design the software for the DATV-Express project. Although the hardware board and software are designed to generate several DATV protocols (like DVB-S2 and DVB-T) this report only used DVB-S (with QPSK modulation) as the primary protocol for our testing. A USB video capture dongle is needed to encode the camera NTSC (or PAL) analog video and audio as highly compressed MPEG-2 data stream for the DATV-Express processing. The video-capture unit used in these tests is the Hauppauge model HVR-1950. Note that Hauppauge uses the designation HVR to mean "hybrid"; indicating that the model includes the capability to capture on-the-air digital-TV (ATSC), as well as analog-TV, as well as analog-camera input.

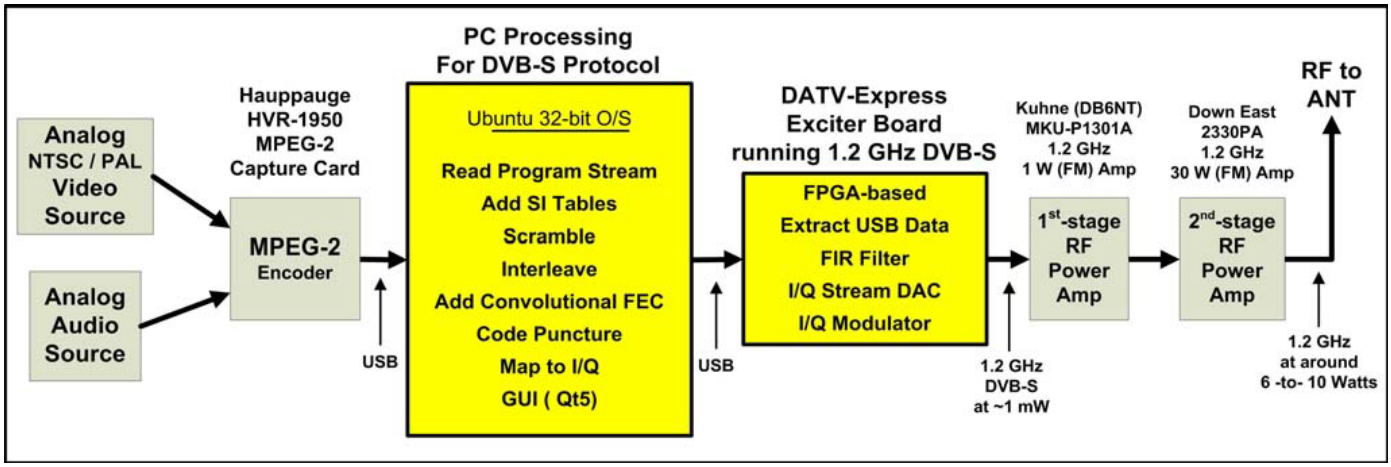


Figure 1 – Test Set-up for Bench Testing of DATV-Express DVB-S Transmitter

Barefoot Exciter Board Tests

Fig 2 shows the exciter board. The modulator chip runs very warm (even in non-transmit mode), so Ken added a 1/4-inch aluminum plate to act as a heat-spreader though the four standoffs on the board.

Figure 2 – The DATV-Express exciter hardware board is fitted with an aluminum plate as a heat-spreader.

Ken had an initial problem in that he did not have the firmware for this Hauppauge model on his computer. Charles easily found the correct Hauppauge firmware file on the internet, Ken put the file on his computer....and the Hauppauge unit now loaded the firmware on

start up in a Ubuntu environment. **Fig 3** shows the clean spectrum view of the barefoot DATV-Express exciter board. The output of the Hauppauge MEG-2 encoder is a data-bit-rate of about 2 Mbits/sec for the normal D1 resolution that is shown on a normal Standard-Definition Digital Television (DVD quality D1 = 720 x 480 Pixel for NTSC). So with the FEC (Forward Error Correction) set to a robust value of 1/2, we used a Symbol-Rate of 2.2 MSymb/sec to provide a compact RF bandwidth of **BWallocated** = 3.0 MHz.

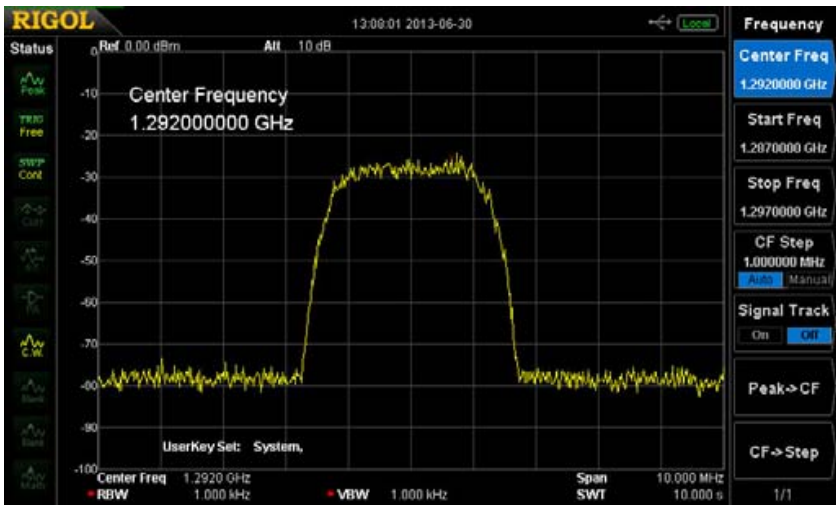


Figure 3 – A clean DVB-S spectrum of Prototype #4 board running 2.2 MSymb/sec on 1.292 GHz.

Ken was able to look at his new RIGOL Spectrum Analyzer and screen-capture the DVB-S spectrum on 1.292 GHz. This RIGOL is really economical (compared to Agilent and used HP units) and works up to 1.5 GHz. Ken also had a bit of difficulty with unexpected video-drop-outs on the Set Top Box. Charles G4GUO suspected a buffering problem inside the PC. So Charles prepared a design change to replace the synchronous software buffering design with asynchronous buffering code. Ken re-built the DATV-Express software application with the new source code using Qt Creator and the video-drop-out problem disappeared. The slow Pentium P4 1.8 GHz probably made Ken's testing more susceptible to display the problem than at QTH of G4GUO with his faster PC. With the video drop-out issue resolved, Ken was able to reliably send DVB-S signals barefoot inside his software lab. **Fig 4** is one of the first DVB-S signals received (using screen-capture on his notebook computer) from across the lab using less than 0 dBm.

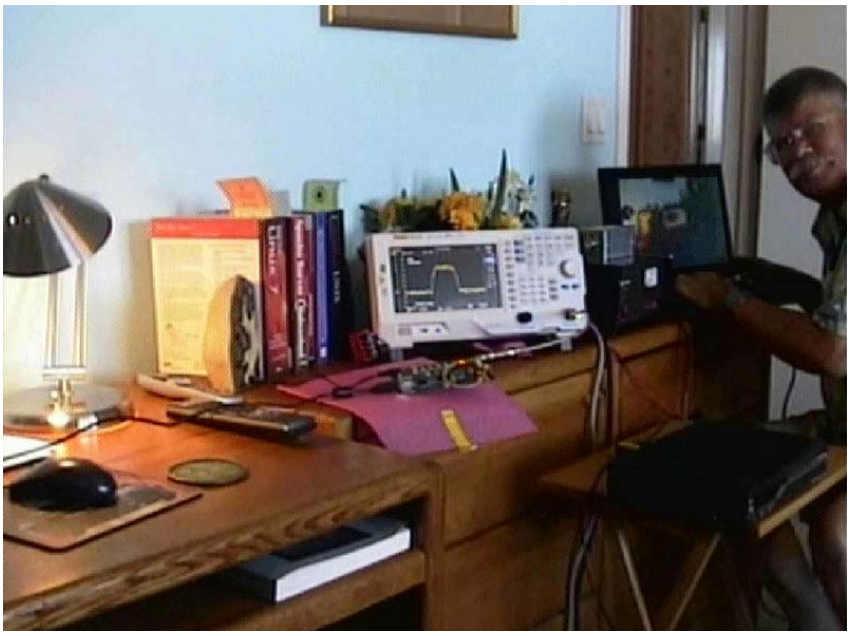


Figure 4 – Early 1.2 GHz DVB-S received video using barefoot DATV-Express to STB to Notebook.

Tests with First-Stage RF Amp

Robbie provided the needed RF attenuators to protect the input of the Spectrum Analyzer's front end (rated at 30 dBm to create "front end" damage) from the first stage RF amplifier. An external attenuator of 20 dB was used in addition to the spectrum analyzer internal setting of 10 dB of attenuation. No "distortion shoulders" (also known as "spectral re-growth") ever appeared on the spectrum output of the Kuhne RF amplifier, with the DATV-Express RF output set to a very high value of 40 (out of 47 levels). The photo in **Fig 6** shows Robbie KB6CJZ inspecting the test setup for measuring the spectrum output of the first-stage Kuhne RF amplifier.

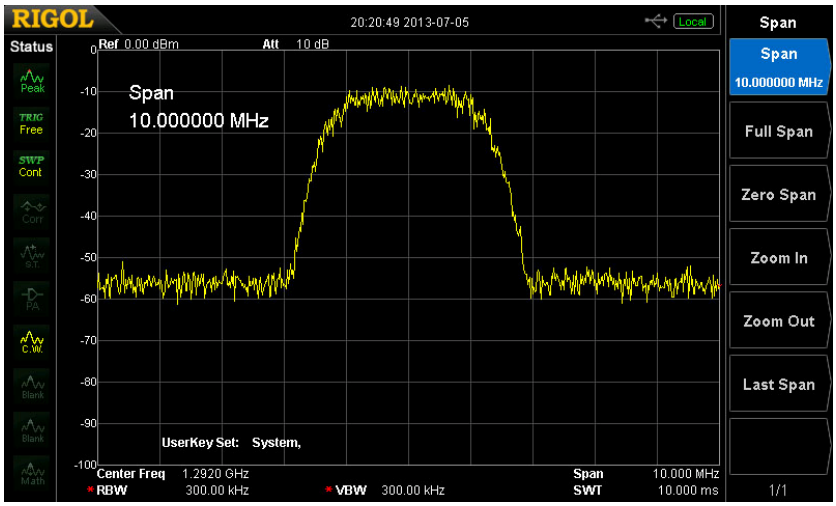


Figure 5 – Clean DVB-S spectrum on 1.2 GHZ using DATV-Express with Kuhne P1301A RF Amp.

Figure 6 – KB6CJZ is shown after connecting an external 20 dB attenuator from Kuhne RF amp.

Tests with Second-Stage RF Amp

Fig 7 shows the Down East model 2330PA RF amplifier that is rated at 30W on FM and can develop about 6-to-10 Watts of output using QPSK digital modulation on 1.2 GHz band.

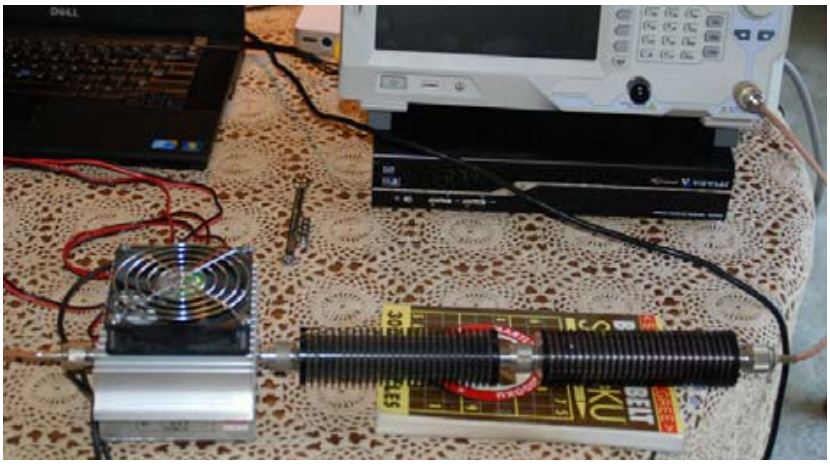


Figure 7 – The Down East RF Power Amp is connected to the Spectrum Analyzer through an external 40 dB of attenuation.

Attenuators totaling 40 dB were used in addition to the spectrum analyzer internal setting of 10 dB of attenuation. **Fig 8** shows the spectrum for the second-stage RF amp output when the DATV-Express RF output drive setting was equal to a value of 30. A table of measurements is provided as **Table 1** that lists the outputs obtained at different levels of power drive settings.

Measuring Power
There are three basic approaches to measuring power for DATV output:

1. Power meter – the most straight forward approach is to use a dedicated power meter that uses a thermal head. All hams seem to agree that the old faithful HP Model 432A is a good choice for DATV.
2. Power-capable Spectrum Analyzer – expensive industrial grade come with a special mode to measure and display channel power directly for digital modulations (such as Tektronix RSA5000).
3. Normal Spectrum Analyzer – Mike WA6SVT explained to Ken to set the RBW and VBW on the "occupied bandwidth".

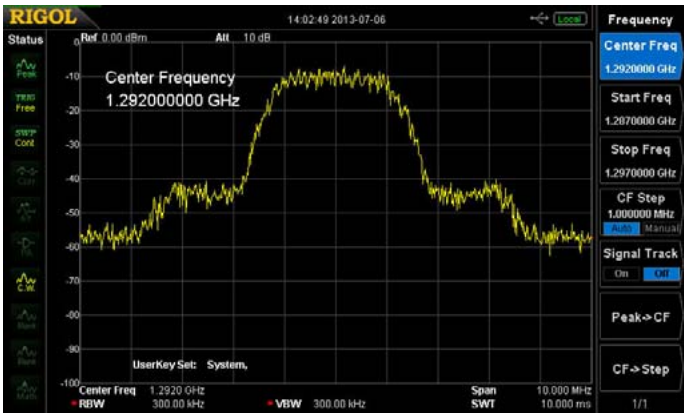


Figure 08 – Spectrum using Down East amplifier shows "shoulders" are developed but down about 32 dB. (DATV-Express power setting is 30)

**Figure 09 – Stray RF from Bench Test set-up provided easy DATV Signal Reception on the STB.
(Notebook screen-capture of W6HHC)**

The power is the top-of-the-haystack. Ron W6RZ and Rob MØDTS have pointed out to us that you can use a little math to calculate the power level from the value at the top of-the-haystack if the spectrum analyzer does not have a wide-enough bandwidth setting. The correction factor in dB to add to the haystack value is: 10*log10 (channel bandwidth/resolution bandwidth).

One aspect of power amplifiers that always surprises newcomers to Digital-ATV is that DATV can NOT achieve the same average power out of an RF amplifier as FM modulation can. This is because most digital modulation technologies (except GMSK) have a very high "peak-to-average ratio". In order to prevent DATV distortion, you need to reduce the drive so that the peaks do not go into compression or flat-topping. On the web site from Alberto (DGØVE) you can read (in German): "All amplifiers can also be used for DVB-S and DVB-T with reduced power. You will notice that in the DVB-S mode only about 20% to 25% of the maximal power (P-1dB) can be used. Working in the DVB-T mode you will get only approximately 8% to 10% of the P–1dB power level."

Table 1 - Measurements taken during DATV-Express DVB-S Transmitter Bench Testing

DATV-Express exciter Menu Power-setting	Kuhne first-amp spectrum level	Spectrum Analyzer RBW setting	"distortion shoulder" below main carrier	Down East 2nd-amp spectrum level	Spectrum Analyzer RBW setting	"distortion shoulder" below main carrier	Down East Power Measurement (HP 432A) Output dBm	Down East Power Measurement (HP 432A) Output W
20	- 2 dBm	300 KHz	NONE				N/A	
30	+ 7 dBm	300 KHz	NONE				N/A	
40	+ 18 dBm	300 KHz	NONE				N/A	
46	+ 25 dBm	300 KHz	- 34 dB				N/A	
The above spectrum reading values account for 30 dB attentuation								
20	N/A			+ 32 dBm	300 KHz	NONE	N/A	
25	N/A			+ 38 dBm	300 KHz	- 35 dB	N/A	
30	N/A			+ 41 dBm	300 KHz	- 32 dB	36.3 dBm	4.3 W
33	N/A			+ 42 dBm	300 KHz	- 30 dB	38.8 dBm	7.6 W
35	N/A			+ 45 dBm	300 KHz	- 28 dB	40.3 dBm	10.7 W
			The above spectrum readings account for 50 dB attenuation					

Software GUI

The current DATV-Express software User Interface is very simple, but it allows the user to easily configure each of the supported protocols (aka modes) to the desired settings such as: frequency, modulation type, FEC, Symbol Rate, and power level. The Tabs along the top of the screen shown in **Fig 10** are set up for DVB-S, DVB-S2, DVB-T, and DVB-T2 protocols. No code has currently been developed for DVB-T2, so the GUI TAB is just a "holding place". Since DATV-Express uses a Software Defined Radio approach, other interested hams could develop software for other protocols such as ITU-T_J.83-Annex-B or DVB-C, etc.

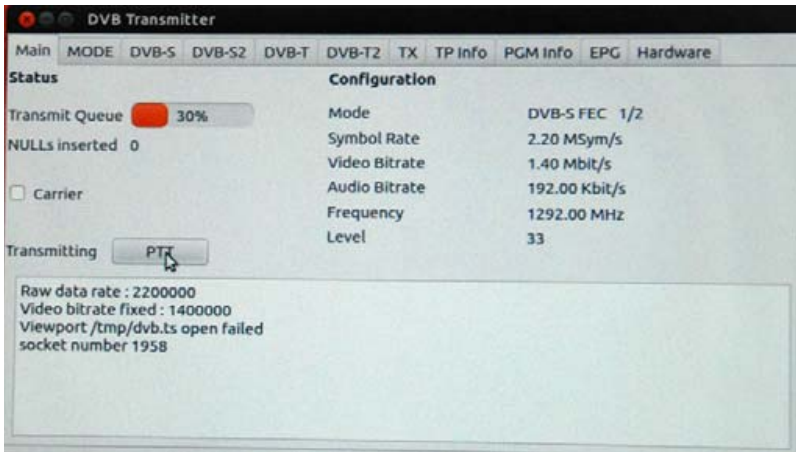


Figure 10 – DATV-Express software User Interface configured for DVB-S Protocol.

Summary and Plans

The bench testing shows that the DATV-Express software and hardware board produce a very clean DVB-S signal. In our opinion, the signal quality appears to be as good as those we have measured with the MiniMod DVB-S boards produced by SR-Systems in Germany. As explained before, DATV-Express is capable of other DATV protocols used by ham radio. **Fig 11** shows the board generating a DVB-T protocol signal using 2 MHz BW with QPSK digital modulation.

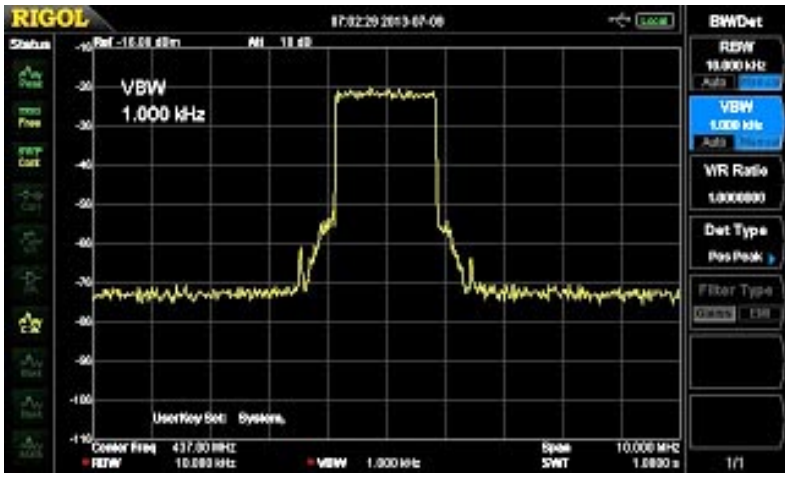


Figure 11 - Spectrum of DATV-Express board running 2 MHz wide DVB-T Protocol on 437 MHz (Courtesy of G4GUO)

Ken and Robbie plan to do some DATV testing between our homes in the near future (flat and only 5 miles, but lots of buildings, elevated freeways, and tall trees.

Interesting DATV URLs

• YouTube Video on DATV-Express board – see **http://youtu.be/OXh-anABYaU**
• British ATV Club - Digital Forum – see **www.BATC.org.UK/forum/**
• Yahoo Group for Digital ATV - see **groups.yahoo.com/group/DigitalATV/**
• Orange County ARC entire series of newsletter DATV articles – see **www.W6ZE.org/DATV/**
• DigiLite Project for DATV (derivative of the "Poor Man's DATV" design)
see **www.G8AJN.tv/dlindex.html**
• Rigol Model DSA815-TG Spectrum Analyzer – see **www.RIGOL.com**
• SR-Systems D-ATV components (Boards and complete XMTR) – see **www.SR-systems.de**
• TAPR 2012 Digital Comm Conf (DCC) Proceedings on "DATV-Express - a Project Update" see **www.TAPR.org/ pub_dcc31.html**
• CQ-DATV online (free bi-monthly) e-magazine – see **www.CQ-DATV.mobi**

…Ken W6HHC and Robbie KB6CJZ

CONSTRUCTION ARTICLE INDEX

The following list is an index of all construction related material that has appeared in the ATCO Newsletter since its inception in the early '80's. This is a handy reference for that particular construction article that you knew existed but didn't want to wade through each issue to find it. All Newsletters below are also listed in order in the ATCO homepage under "Newsletters". CTRL Click on www.atco.tv. Once you locate the Newsletter section, the displayed list can then be re-sorted as needed by clicking on the "date" in the header.
…Bob N8OCQ

Issue	Page(s)	Article
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Vol 2 I	4	439 Beam
Vol 2 II	8,9	439 Parabolic Ant
Vol 2 II	9	Video Modulator
Vol 2 III	7	1296 Ant 45 Ele loop yagi
Vol 2 III	10	RF Power Indicator (in-line) for 1296 MHZ
Vol 2 SE	2,3	Diode Multiplier for 23 CM
Vol 2 SE	4,5	1296 MHZ 10 Watt Solid State Linear Amp
Vol 4 I	3	RF/Video Line Sampler
Vol 4 II	3	P-Unit Meter
Vol 4 II	7,10,11	UHF Gated Noise Source
Vol 4 II	12	420 – 450 Broom Handle Rhombic Ant
Vol 4 III	4,8	25 Element 1.26 Loop Yagi
Vol 4 IIII	6	Video Modulator (Tube Type)
Vol 5 I	3	Video Modulator One Transistor
Vol 5 II	4,7	900 MHZ Yagi Ant
Vol 5 II	6	Video Modulator for 2C39 Final
Vol 5 III	3	440 MHZ Hidden Transmitter Finder
Vol 6 I	3	Video Line Amp
Vol 6 I	8	25 Ele 910 MHz Loop Yagi
Vol 6 II	4,6,7	Microwave Oven ATV Xmiter
Vol 6 II	5	Matching a Quad Driven Ele
Vol 6 II	8	Power Divider for 33CM
Vol 9 IIII	5,7	16 Ele Loop Yagi for 439.25 MHz
Vol 10		No Articles
Vol 11 II	4,5,6	439 48 Ele Collinear Ant
Vol 11 IIII	7	1280 MHZ Cavity Filter
Vol 12 I	6,7,8	439 & 1200 Horz Polarized Mobile Ant
Vol 12 II	5,6,7	ATV Line Sampler
Vol 12 II	10	439 & 1280 Interdigital Filter(s)
Vol 12 III	6,7,8	439 Cheap Attic Ant
Vol 13 I	9, 10	High Level Modulator for ATV
Vol 13 II	5	VGA to NTSC Converter for Computer
Vol 13 III	9, 10	AM Video Modulator
Vol 13 IIII	4	1200 MHZ Transistor Linear Amp
Vol 13 IIII	6	900 & 1200 MHz Loop Yagis
Vol 14 IIII	8	439 31 EleYagi
Vol 14 IIII	12, 13	1250 MHZ FM ATV 3 Watt Xmiter
Vol 15 I	16	427.25 Horz J-Pole Ant
Vol 15 II	14	2400 MHZ Loop Yagi
Vol 15 III	8	Wavecom Modification
Vol 15 III	12,13,14	2.4 Gig Antenna's
Vol 16 II	20	2.4 Gig Helix Ant
Vol 16 IIII	4	1280 MHZ Loop Yagi
Vol 17 I	14, 15	Video Amp (Multi Output)
Vol 18		No Articles
Vol 19 IIII	4	Pwr Supply for 28 Volt Ant Relay
Vol 20 III	9, 10	Video Sampler
Vol 21 II	4	RF Pwr Amp for 900/1200 MHZ
Vol 21 II	14	10-14 Volt Doubler for 28 Volt Ant Relays
Vol 21 III	5	S-Video To Composite Adaptor
Vol 21 IIII	3,4	Video Noise Rejection Amp
Vol 21 IIII	14,15,16 ,17	"S" Meter For Comtech Boards
Vol 22 I		No Articles
Vol 22 II	10	1260 MHZ Cavity Filter
Vol 22 III		No Articles
Vol 22 IIII		No Articles
Vol 23 I		No Articles
Vol 23 II	5,6	Linear 60 Watt For 70CM
Vol 23 II	8,9	Video Modulator Update
Vol 23 III		No Articles
Vol 23 IIII		No Articles
Vol 24 I	13	RF Sniffer For 2.4 GIG
Vol 24 II		No Articles
Vol 24 III	3	Quantum 1500 Rec Tuner Mod
Vol 24 IIII	9	Battery Recharge Ckt
Vol 25 I		No Articles
Vol 25 II	6,7	Comtech TX Module Improvement
Vol 25 III	11	Comtech TX Module Improvement Correction
Vol 26 I	6	Isolator (Circulator) Mod. 850 To 1260 MHz
Vol 26 II	5,6	Comtech 1200 MHz rec. module improvements
Vol 26 III		No Articles
Vol 26 IIII	9	Remote Touch Tone Decoder For Your Shack
Vol 27 I	10	ATV Low Pass Filter (427 Mhz)
Vol 27 II	15	PictureTel Camera Data Cable Wiring
Vol 27 II	10	ATV Low Pass Filter (427 Mhz)
Vol 27 II	15	PictureTel Camera Data Cable Wiring
Vol 27 III		No articles
Vol 27 IIII		No articles
Vol 28 I	11	Super 1280 MHz amplifier
Vol 28 II		No articles
Vol 28 III		No articles
Vol 28 IIII		WB8LGA Antenna switching system
Vol 29 I		No articles
Vol 29 II		1280 MHz Hi Gain Panel Antenna
Vol 29 III		No articles
Vol 29 IIII		No articles
Vol 30 I		No articles
Vol 30 II		No articles

This is the complete list for construction articles shown in past ATCO newsletters. The page numbers listed may not match the actual page in the Newsletter. They are the numbers shown in the PDF file. Some early issues are missing. Art did not have a copy of every year. This list is complete through Volume 30 I.
…Bob N8OCQ

NEW MEMBER(S)

Let's welcome the new members to our group! If any of you know anyone who might be interested, let one of us know so we can flood them with information. New members are our group's lifeblood so it's important we aggressively recruit new faces.

WA6RZW Ed Mersich, Elizabeth, Colorado
…WA8RMC

LOCAL HAMFEST SCHEDULE

This section is reserved for upcoming Hamfests. They are limited to Ohio and vicinity easily accessible in one day. Anyone aware of an event incorrectly or not listed here; notify me so it can be corrected. This list will be amended, as further information becomes available. To see additional details for each Hamfest, Control Click on the blue title and the magic of the Internet will give you the details complete with a map! To search the ARRL Hamfest database for more details, CTL click ARRLWeb: Hamfest and Convention Calendar .
…WA8RMC.

07/20/2013 | NOARSFEST
Location: Elyria, OH
Type: ARRL Hamfest
Sponsor: Northern Ohio Amateur Radio Society
Website: http://www.noars.net

07/21/2013 | Van Wert ARC Hamfest
Location: Van Wert, OH
Type: ARRL Hamfest
Sponsor: Van Wert Amateur Radio Club
Website: http://w8fy.org

07/28/2013 | Portage Hamfair
Location: Randolph, OH
Type: ARRL Hamfest
Sponsor: Portage Amateur Radio Club
Website: http://Hamfair.com

08/03/2013
Great Lakes Div Convention & Columbus Hamfest
Location: Columbus, OH
Type: ARRL Convention
Sponsor: Voice of Aladdin ARC
Website: http://www.columbushamfest.com

08/18/2013 | Warren Hamfest
Location: Cortland, OH
Type: ARRL Hamfest
Sponsor: Warren Amateur Radio Association
Website: http://warrenhamfest.blogspot.com/

08/25/2013 | 5th Annual CFARC Tailgate Fest
Location: Stow, OH
Type: ARRL Hamfest
Sponsor: Cuyahoga Falls Amateur Radio Club
Website: http://cfarc.org/tailgate2013.html

09/07/2013 | Tailgate/Hamfest 2013
Location: Austintown, OH
Type: ARRL Hamfest
Sponsor: 20/9 Amateur Radio Club
Website: http://www.20over9.org

09/08/2013 | Findlay Hamfest
Location: Findlay, OH
Type: ARRL Hamfest
Sponsor: Findlay Radio Club
Website: http://w8ft.org

09/22/2013 | Cleveland Hamfest and Computer Show
Location: Berea, OH
Type: ARRL Hamfest
Sponsor: Hamfest Association of Cleveland, Inc.
Website: http://www.hac.org

INTERNET ATV HOME PAGES (list verified 01/21/12)

Domestic homepages

http://www.atco.tv	Ohio, Columbus, homepage (ATCO)
http://www.w8bi.org/atv/atvresources.html	Ohio, Dayton ATV group (DARA)
http://www.citynight.com/atv	California, San Francisco ATV
http://atn-tv.org/ATN.htm	California, Amateur Television Network in Central / Southern
http://members.tripod.com/silatvg	Illinois, Southern, Amateur Television group
http://www.ussc.com/~uarc/utah_atv/id_atv1.html	Idaho ATV
www.bratsatv.org.	Maryland, Baltimore Radio Amateur Television Soc. (BRATS)
www.qsl.net/k7atv/	Salem, Oregon Amateur Television Associations-Salem
http://www.qsl.net/kd2bd/atv.html	New Jersey, Brookdale ARC N2SMT/R repeater
http://www.ipass.net/~teara/menu3.html	North Carolina, Triangle Radio Club (TEARA)
http://www.oregonatv.org	Oregon, Portland OATVA ATV Association W7AMQ/R repeater
http://members.bellatlantic.net/~theojkat/	Pennsylvania, Phila. Area ATV W3PHL repeater
http://www.hotarc.org/atv.html	Texas, WACO Amateur TV Society (WATS)
www.qsl.net/ww7ats	Washington, Western Washington Television Soc. (WWATS)
http://www.shopstop.net/bats/	Wisconsin, Badgerland Amateur Television Society (BATS)
http://www.kcatvg.org	Kansas, Kansas City ATV Group WR0ATV repeater (KCATVG)

Foreign homepages

http://atv.hamradio.si	Slovenia ATV
http://www.batc.tv.	British ATV club (BATC)
http://www.**batc.org.uk/cq-tv**	British ATV Club and CQ-TV Magazine

Misc other ATV related sites

http://www.atv-tv.org	The Amateur Television Directory
http://www.atn-tv.org	Amateur Television Network
http://www.atvquarterly.com	Amateur Television Quarterly Magazine
http://gb3lo.camstreams.com	"GB3LO" Repeater Camstream westoft, UK
http://www.ham-radio.com/sbms	"SBMS" San Bernardino Microwave Society
http://www.qsl.net/kc6ccc/	"METS" Microwave Experimenters Television System
http://www.icircuits.com/store/index.html	Intuitive Circuits ATV products
http://www.atvresearch.com/	ATV Research Co, cameras & related security products
http://www.downeastmicrowave.com/	Down East Microwave, UHF/Microwave parts
http://www.directivesystems.com/	Directive Systems, UHF/VHF/Microwave antennas
http://www.m2inc.com/	M2 Antenna Systems
http://www.hamtv.com/	PC Electronics, ATV equipment

TUESDAY NITE NET ON 147.48 MHz SIMPLEX

Every Tuesday night @ 9:00PM WA8RMC hosts a net for the purpose of ATV topic discussion. There is no need to belong to the club to participate, only a genuine interest in ATV. All are invited. For those who check in, the general rules are as follows: Out-of-town and video check-ins have priority. A list of available check-ins is taken first then a roundtable discussion is hosted by WA8RMC. After all participants have been heard, WA8RMC will give status and news if any followed by late checkin requests or comments. We usually chat for about ½ hour so please join us locally or via internet if you can.

ATCO TREASURER'S REPORT - de N8NT

OPENING BALANCE (04/18/13)…….$2030.60
RECEIPTS(dues)…….$ 252.00
Food for Spring Event plus stamps for Newsletter……$(179.18)
Paypal fee…….$ (1.17)
CLOSING BALANCE (07/18/13)……. $2102.25

ATCO REPEATER TECHNICAL DATA SUMMARY

Location: Downtown Columbus, Ohio
Coordinates: 82 degrees 59 minutes 53 seconds (longitude) 39 degrees 57 minutes 45 seconds (latitude)
Elevation: 630 feet above average street level (1460 feet above sea level)

TV Transmitters: 427.25 MHz VSB AM mod, 1258 MHz FM mod, 1268 MHz QPSK digital, 2433 MHz FM mod, and 10.350 GHz FM mod.
(multipole filters in output lines of all transmitters)
Output Power - 427.25 MHz: 50 watts average 100 watts sync tip
1258 MHz: 40 watts continuous (Analog ATV)
1268 MHz 20 watts continuous DVB-S (QPSK) DATV SR=3.125Msps, FEC=3/4 , 2 video channels.
(PMT PID:32, Video PID:162, Teletext PID:304, PCR PID:133, Audio PID:88, Service ID:5004)
2433 MHz: 15 watts continuous
10.350 GHz: 1 watt continuous
Link transmitter - 446.350 MHz: 5 watts NBFM 5 kHz audio

Identification: 427, 1258, 1268, 2433, 10.350 GHz transmitters video identify every 15 min. with ATCO & WR8ATV on 6 different screens.
1268 MHz digital & 10.350 GHz analog - Continuous transmission of ATCO & WR8ATV with no input signal present.

Transmit antennas: 427.25 MHz - Dual slot horizontally polarized "omni" 7 dBd gain major lobe east/west, 5dBd gain north/south
1258 MHz - Diamond vertically polarized 12 dBd gain omni (Analog ATV)
1268 MHz - Diamond vertically polarized 12 dBd gain omni (Digital DVB-S ATV)
2433 MHz - Comet Model GP24 vertically polarized 12 dBd gain omni
10.350 GHz - Commercial 40 slot waveguide horizontally polarized 16 dBd gain omni

Receivers: 147.480 MHz - F1 audio input with touch tone control. (Input here = output on 446.350)
439.250 MHz - A5 NTSC video with FM subcarrier audio, lower sideband. (Input here = output on all TV transmitters)
449.975 MHz - F1 audio input aux touch tone control. 131.8 Hz PL tone. (Input here = output on 446.350).
1280.00 MHz - F5 video analog NTSC. (Input here = output on all TV transmitters)
1280.00 MHz - DVB-S (QPSK) digital SR=4.167Msps, FEC=7/8, PCR PID:33, Video PID:33, Audio PID:49
This input feeds all transmitters and also directly to 1268 MHz digital output channel 2. Therefore, 1280 DATV input and 439 or 2398 can be ON at the same time. (Input here = output on all TV transmitters)
2398.00 MHz - F5 video analog NTSC. (Input here = output on all TV transmitters)
10.450 GHz - F5 video analog NTSC

Receive antennas: 147.480 MHz - Vert. polar. Diamond 6dBd dual band (also used for 446.350 MHz link output)
439.250 MHz - Horizontally polarized dual slot 7 dBd gain major lobe west
1280.00 MHz - Diamond vertically polarized 12 dBd gain omni
2398.00 MHz - Comet Model GP24 vertically polarized 12 dBd gain omni
10.450 GHz - Commercial 40 slot waveguide horizontally polarized 16 dBd gain omni

Auto mode Input control:

Touch Tone	Result (if third digit is * function turns ON, if it is # function turns OFF)
00*	turn transmitters **on** (enter manual mode-keeps transmitters on till 00# sequence is pressed)
00#	turn transmitters **off** (exit manual mode and return to auto scan mode)
264	Select Channel 4 Doppler radar. (Stays up for 5 minutes) Select # to shut down before timeout.
697	Select Time Warner radar. (Stays up till turned off). Select # to shut down.
003	Select room camera (**Always exit by selecting 001**)
002	Select roof camera. Select room cam first then 002 for roof cam. (**Always exit by selecting 001**)
001	Select 2398 MHz receiver for auto scan to continue

Manual mode Functions:

00* then 1 for Ch. 1 Select 439.25 receiver
00* then 2 for Ch. 2 Select 1280 digital receiver
00* then 3 for Ch. 3 Select 1280 analog receiver
00* then 4 for Ch. 4 Select 2398 receiver
00* then 5 for Ch. 5 Select video ID (6 identification screens)

01* or 01#	Channel 1 439.25 MHz scan enable (hit 01* to scan this channel & 01# to disable it)
02* or 02#	Channel 2 1280 MHz digital receiver scan enable
03* or 03#	Channel 3 1280 MHz analog receiver scan enable
04* or 04#	Channel 4 2398 MHz scan enable
A1* or A1#	Manual mode select of 439.25 receiver audio
A2* or A2#	Manual mode select of 1280 digital receiver audio
A3* or A3#	Manual mode select of 1280 analog receiver audio
A4* or A4#	Manual mode select of 2398 receiver audio
C0* or C0#	Beacon mode – transmit ID for twenty seconds every ten minutes
C1* or C1#	C1* to disable 427 MHz transmitter, C1# to enable it
C2* or C2#	C2* to disable 1268 MHz digital transmitter, C2# to enable it

ATCO MEMBERS as of July 2013

Call	Name	Address	City	St	Zip	Phone
KD8ACU	Robert Vieth	3180 North Star Rd	Upper Arlington	OH	43221	614-457-9511
KC3AM	Dave Stepnowski	735 W Birchtree Ln	Claymont	DE	19703	
AH2AR	Dave Pelaez	1348 Leaf Tree Lane	Vandalia	OH	45377	
W8ARE	Larry Meredith III	6070 Langton Circle	Westerville	OH	43082-8964	
KC8ASF	Tom Pallone	3437 Dresden St.	Columbus	OH	43224	614-268-4873
NN8B	Don Kemp	6384 Camp Blvd.	Hanoverton	OH	44423	
W6CDR	Wynn Rollert	1141 Pursell Ave	Dayton	OH	45420	937-256-1772
WB8CJW	Dale Elshoff	8904 Winoak Pl	Powell	OH	43065	614-210-0551
N8COO	C Mark Cring	2844 Sussex Place Dr.	Grove City	OH	43123	614-836-2521
WB8CXO	Mike Young	289 Gayloard Dr	Munroe Falls	OH	44262	
N8CZO	Mike Flaharty	1025 Josiah Morris Road	London	OH	43140	
N3DC	William Thompson	6327 Kilmer St	Cheverly	MD	20785	301-772-7382
WA8DNI	John Busic	2700 Bixby Road	Groveport	OH	43125	614-491-8198
K8DMR	Ron Fredricks	8900 Stonepoint Ct	Jennison	MI	49428-8641	
K8DW	Dave Wagner	2045 Maginnis Rd	Oregon	OH	42616	419-691-1625
WB8DZW	Roger McEldowney	5420 Madison St	Hilliard	OH	43026	614-405-1710
KC8EVR	Lester Broadie	108 N Burgess	Columbus	OH	43204	
WA8FLY	Rod Shaner	16012 London Rd.	Orient	OH	43146	740-279-3614
N8FRT	Tom Flanagan	6156 Jolliff St.	Galloway	OH	43119	
W8FTX	George Biundo	3675 Inverary Drive	Columbus	OH	43228	614-274-7261
WB2FVE	Craig Blaine	1195 Hooverview Drive	Westerville	OH	43082	614-891-5378
W8FZ	Fred Stutske	8737 Ashford Lane	Pickerington	OH	43147	
KB8GHW	Mike Amirault	5560 Refugee Rd.	Baltimore	OH	43105	614-859-7005
WA8HFK,KC8HIP	Frank & Pat Amore	3630 Dayspring Dr	Hilliard	OH	43026	614-777-4621
W4HTB	Henry Cantrell	905 Wrenwood Dr.	Bowling Green	KY	42103	270-781-9624
WG8I	Chris Vojsak Sr,	3536 W Henderson Rd	Columbus	OH	43220-2232	614-203-6000
WB2IIR	Michael Anthony	370 Georgia Drive	Brick	NJ	08723	
N8IJ	Dick Knowles	1799 Homeward Ave	Lima	OH	45805	419-231-7277
W8KHP	Allan Vinegar	2043 Treetop Lane	Hebron	Ky	41048	
WA8KQQ	Dale Waymire	225 Riffle Ave	Greenville	OH	45331	937-548-2492
N8LRG	Phillip Humphries	3226 Deerpath Drive	Grove City	OH	43123	614-871-0751
WB8LGA	Charles Beener	2540 State Route 61	Marengo	OH	43334	
KA8LWR	Mel Alberty	1645 Olentangy Road	Bucyrus	OH	44820	419-468-2971
KD8KDM	Mike Bowlus	127 W. Plum St. PO box 221	Saint Paris	OH	43072	
W8MA	Phil Morrison	154 Llewellyn Ave	Westerville	OH	43081	
KA8MFD	Ross McCoy	227 S Boundary St PO Box 9	Edison	OH	43320	
KA8MID	Bill Dean	2630 Green Ridge Rd	Peebles	OH	45660	
N8NT	Bob Tournoux	3569 Oarlock Ct	Hilliard	OH	43026	614-876-2127
WU8O	Tom Walter	15704 St Rt 161 West	Plain City	OH	43064	614-733-0722
N0OBG	Jim Conley	33 Meadowbrook C C Est	Ballwin	MO	63011	
N8OCQ	Bob Hodge Sr.	3750 Dort Place	Columbus	OH	43227-2022	
W6ORG,WB6YSS	Tom, Maryann O'Hara	2522 Paxson Lane	Arcadia	CA	91007-8537	626-447-4565
KE8PN	James Easley	1507 Michigan Ave	Columbus	OH	43201	614-421-1492
W8PU	Gary Poland	3347 S.R. 28	Midland	OH	45148	
W3RCJ	Thomas Farrell	1912 Burnwood Road	Baltimore	MD	21239	
WA8RMC	Art Towslee	438 Maplebrooke Dr W	Westerville	OH	43082	614-891-9273
W8RRF	Paul Zangmeister	10365 Salem Church Rd	Canal Winchester	OH	43110	
W8RRJ,W8WTB	John Hull	580 E. Walnut St.	Westerville	OH	43081	614-882-6527
W8RUT,N8KCB	Ken & Chris Morris	2895 Sunbury Rd	Galina	OH	43021	
W8RVH	Richard Goode	9 Master Street Apt A	Springfield	OH	45504	937-478-6488
W8RQI	Ray Zeh	2263 Heysler Rd	Toledo	OH	43617	
KB8RVI	David Jenkins	1941 Red Forest Lane	Galloway	OH	43119	614-878-0575
W8RWR	Bob Rector	135 S. Algonquin Ave	Columbus	OH	43204-1904	614-276-1689
W8RXX,KA8IWB	John & Laura Perone	3477 Africa Road	Galena	OH	43021	614-579-0522
WA6RZW	Ed Mersich	34401 Columbine Trl West	Elizabeth	CO	80107	
W8SJV, KA8LTG	John & Linda Beal	5001 State Rt. 37 East	Delaware	OH	43015	740-369-5856
KB8SSH	Mike Cotts	3424 Homecroft Dr	Columbus	OH	43224	614-371-7380
W3SST	John Shaffer	6706 Gilette Dr	Reynoldsburg	OH	43068	614-751-0029
WA6SVT	Mike Collis	PO Box 1594	Crestline	CA	92325	
W8TIP	Gene Hawkins	1720 Liberty Street	Toledo	OH	43605	
KD8TIZ	Bob Holden	5161 Goose Lane Rd	Alexandria	OH	43001-9730	614-562-8441
K8TPY, K8FRB	Jeff & Dianna Patton	3886 Agler Road	Columbus	OH	43219	
NR8TV	Dave Kibler	243 Dwyer Rd	Greenfield	OH	45123	937-981-1392
W8URI	William Heiden	5898 Township Rd #103	Mount Gilead	OH	43338	419-947-1121
KB8UWI	Milton McFarland	115 N. Walnut St.	New Castle	PA	16101	
WA8UZP	James R. Reed	818 Northwest Blvd	Columbus	OH	43212	614-297-1328
KB8WBK	David Hunter	45 Sheppard Dr	Pataskala	OH	43062	740-927-3883
KC8WRI	Tom Bloomer	PO Box 595	Grove City	OH	43123	
AA8XA	Stan Diggs	2825 Southridge Dr	Columbus	OH	43224-3011	
KB8YMQ	Jay Caldwell	4740 Timmons Dr	Plain City	OH	43064	
KC8YPD	Joe Ebright	3497 Ontario St	Columbus	OH	43224	
N8YZ	DaveTkach	2063 Torchwood Loop S	Columbus	OH	43229	614-882-0771
W8ZCF	Ferrel Winder	6686 Hitching Post Ln.	Cincinnati	OH	45230	
K3ZKO	Ron Cohen	915 Rowland Ave	Cheltenham	PA	19012	215-828-1263
KA8ZNY,N8OOY	Tom & Cheryl Taft	386 Cherry Street	Groveport	OH	43125	614-202-9042

ATCO MEMBERSHIP INFORMATION

Membership in ATCO (Amateur Television in Central Ohio) is open to any licensed radio amateur who has an interest in amateur television. The annual dues are $10 per person payable on January 1 of each year. Additional members within an immediate family and at the same address are included at no extra cost.

ATCO publishes this Newsletter quarterly in January, April, July, and October. It is sent to each member without additional cost. All Newsletters are sent via Email unless the member does not have an internet connection.

The membership period is from January 1ST to December 31ST. New members joining before August will receive all ATCO Newsletters published during the current year prior to the date they join ATCO. For example, a new member joining in June will receive the January and April issues in addition to the July and October issues. For those joining after August 1ST, they can elect to receive a complementary October issue with the membership commencing the following year or get the previous (3) Newsletters. Your support of ATCO is welcomed and encouraged.

Membership expiration notices will be sent out in January in lieu of Newsletters for those with an expired membership.

NOTE: Dues records on your individual portion of the ATCO website are listed as the date money is received and shows due one year from that date. The actual expiration is on January of the following year so we can keep the dues clock consistent with the beginning of each year.

ATCO CLUB OFFICERS

President:	Art Towslee WA8RMC	Repeater trustees:	Art Towslee WA8RMC
V. President:	Ken Morris W8RUT		Ken Morris W8RUT
Treasurer:	Bob Tournoux N8NT		Dale Elshoff WB8CJW
Secretary:	Mark Cring N8COO	Statutory agent:	Tom Bloomer KC8WRI
Corporate trustees:	Same as officers	Newsletter editor:	Art Towslee WA8RMC

ATCO MEMBERSHIP APPLICATION

RENEWAL ○ NEW MEMBER ○ DATE _____
CALL _____
OK TO PUBLISH PHONE # IN NEWSLETTER YES ○ NO ○
HOME PHONE _____
NAME _____
INTERNET Email ADDRESS _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____-_____
FCC LICENSED OPERATORS IN THE IMMEDIATE FAMILY
_____
COMMENTS _____
_____
_____
ANNUAL DUES PAYMENT OF $10.00 ENCLOSED CHECK ○ MONEY ORDER ○

Make check payable to ATCO or Bob Tournoux & mail to: Bob Tournoux N8NT 3569 Oarlock CT Hilliard, Ohio 43026. Or, if you prefer, pay dues via the Internet with your credit card. Go to www.atco.tv and fill out the “pay ATCO dues” section. Alternately, you can use the ATCO web site www.atco.tv/PayDues.aspx directly. Credit card payment is made through "PayPal" but you DO NOT need to join PayPal to send your dues. Simply DO NOT fill out the password details and there will be no “PayPal” involvement.

ATCO Newsletter
c/o Art Towslee -WA8RMC
438 Maplebrooke Dr. W
Westerville, Ohio 43082

FIRST CLASS MAIL

REMEMBER...CLUB DUES ARE NEEDED.
CHECK THE
MEMBERS PAGE OF ATCO WEBSITE FOR THE EXPIRATION DATE.
SEND N8NT A CHECK OR USE PAYPAL IF EXPIRED.